signals produced by forward prediction on a frame by frame basis, the apparatus comprising:

excitation source modifying means for extending or shortening said predictive residual signals on a time axis; and

synthesizing means for synthesizing an audio signal based on predictive residual signals converted by said excitation source modifying means.

--2. (Amended) The audio signal processing apparatus as set forth in claim 1, wherein said excitation source modifying means comprises:

first dividing means for dividing said predictive residual signals into a plurality of sub-frames based on a pitch;

second dividing means for dividing a signal of sub-frames into a first signal having a length m (where m is an integer and $m<L$, where L is the length of said sub-frame) and a second signal having a length (L-m) as a reference signal;

finding means for finding a signal closest to said reference signal from an other sub-frame,

wherein said excitation source modifying means shortens said predictive residual signals by concatenating the first signal and the closest signal.

--3. (Amended) The audio signal processing apparatus as set forth in claim 2, wherein said finding means calculates cross-correlation values with said reference signal for signals of said other sub-frame, takes out a signal as the closest signal from a position where the calculated cross-correlation value becomes the largest.

--4. (Amended) The audio signal processing apparatus as set forth in claim 2, wherein said finding means calculates a square error with said reference signal for signals of said other sub-frame and takes out a signal as the closest signal from a position where the calculated square error becomes the smallest.

--5. (Amended) The audio signal processing apparatus as set forth in claim 1, wherein

said excitation source modifying means extends said predictive residual signals by a predetermined extension rate by finding a signal having a predetermined length from the end of the predictive residual signals of a frame; and

concatenating said signal after the end of the predictive residual signals to generate extended predictive residual signals.

--6. (Amended) The audio signal processing apparatus as set

forth in claim 1, wherein said synthesizing means comprises a linear prediction code synthesis filter.

--7. (Amended) An audio signal processing apparatus for reproducing an audio signal by decoding encoded predictive residual signals produced by forward prediction on a frame by frame basis, the apparatus comprising:

excitation source modifying means for shortening the predictive residual signals by taking out a first signal in a sub-frame of the predictive residual signals and a second signal in a following sub-frame based on cross-correlation while maintaining a pitch, or for extending the predictive residual signals by connecting data estimated by extrapolation to signals of a frame while maintaining the pitch, and

synthesizing means for synthesizing an audio signal based on predictive residual signals converted by said excitation source modifying means.

--8. (Amended) The audio signal processing apparatus as set forth in claim 7, wherein said excitation source modifying means comprises:

dividing means for dividing a signal of said sub-frame into a first signal having a length m (where m is an integer and m<L,

where L is the length of said sub-frame) and a second signal having a length (L-m) as a reference signal;

finding means for finding a signal closest to said reference signal from an other sub-frame,

wherein said excitation source modifying means shortens said predictive residual signals by concatenating the first signal and the closest signal.

--9. (Amended) The audio signal processing apparatus as set forth in claim 8, wherein

said excitation source modifying means comprises:

first multiplying means for multiplying said reference signal by a first window function;

second multiplying means for multiplying signal taken out from said other sub-frame by a second window function; and

adding means for adding results of said first and second multiplying means,

wherein said excitation source modifying means concatenates results of said adding means after the first signal taken out from said sub-frame to generate one pitch worth of new predictive residual signals.

--10. (Amended) The audio signal processing apparatus as set

forth in claim 8, wherein said finding means calculates cross-correlation values with said reference signal for a signal of said other sub-frame and takes out a signal as the closest signal from a position where the calculated cross-correlation value becomes the largest.

--11. (Amended) The audio signal processing apparatus as set forth in claim 8, wherein said finding means calculates a square error with said reference signal for a signal of said other sub-frame and takes out a signal as the closest signal from a position where the calculated square error becomes the smallest.

--12. (Amended) The audio signal processing apparatus as set forth in claim 7, wherein said excitation source modifying means extends said predictive residual signals by a predetermined extension rate by finding a signal having a predetermined length from the end of the predictive residual signals of a frame; and concatenating said signal after the end of the prediction residual signals to generate extended predictive residual signals.

--13. (Amended) The audio signal processing apparatus as set forth in claim 7, wherein said synthesizing means comprises a linear prediction code synthesis filter.

--14. (Amended) An audio signal processing method for extending or shortening predictive residual signals on a time axis in decoding a signal encoded by forward prediction on a frame by frame basis, comprising the steps of:

processing for shortening the predictive residual signals by taking out a first signal in a sub-frame of the predictive residual signals and a second signal in a following sub-frame based on cross-correlation while maintaining a pitch or for extending the predictive residual signals by connecting data estimated by extrapolation to signals of a frame while maintaining the pitch so as to shorten or extend the signals of one frame, and

processing for synthesizing an audio signal based on said shortened or extended predictive residual signals.

--15. (Amended) The audio signal processing method as set forth in claim 14, wherein the step of shortening said predictive residual signals includes:

dividing a signal of said sub-frame into a first signal having a length m (where m is an integer and m<L, where L is the length of said sub-frame) and a second signal having a length (L-m) as a reference signal;

finding a signal closest to said reference signal from an other sub-frame; and

concatenating the first signal and the closest signal.

--16. (Amended) The audio signal processing method as set forth in claim 15, further comprising shortening said predictive residual signals by

first multiplication processing for multiplying said reference signal by a first window function;

second multiplication processing for multiplying a signal taken out from said other sub-frame by a second window function; and

adding processing for adding results of said first and second multiplying means and

concatenating the results of said adding processing after the first signal taken out from said sub-frame to generate one pitch worth of new predictive residual signals.

--17. (Amended) The audio signal processing method as set forth in claim 14, further comprising extending said predictive residual signals by a predetermined extension rate by finding a signal having a predetermined length from the end of the predictive residual signals of a frame; and concatenating said signal at the end of the predictive residual signals to generate extended predictive residual signals.